

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
1 August 2002 (01.08.2002)

PCT

(10) International Publication Number
WO 02/058508 A2

(51) International Patent Classification⁷: **A46B 11/00**

(21) International Application Number: PCT/EP02/00634

(22) International Filing Date: 23 January 2002 (23.01.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
MI2001U000045 26 January 2001 (26.01.2001) IT

(71) Applicant and

(72) Inventor: **CALLIGARO, Vanni** [IT/IT]; Via Durazzo, 5,
I-20131 Milano (IT).

(74) Agents: **PETRUZZIELLO, Aldo** et al.; Racheli & C.
S.P.A., Viale San Michele del Carso, 4, I-20144 Milano
(IT).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,

CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG,
SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GI, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,
GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NE, SN, TD, TG).

Declaration under Rule 4.17:

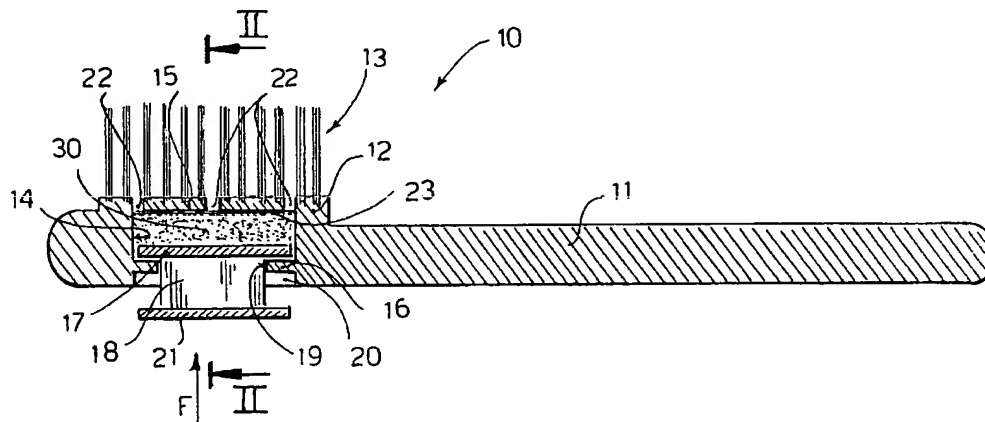
— of inventorship (Rule 4.17(iv)) for US only

Published:

— without international search report and to be republished
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: **IMPROVED TOOTHBRUSH**



(57) Abstract: A toothbrush (10; 100; 200; 300) that includes a head (12; 312) supporting a set of bristles (13), a handle (11; 311) joint to the head (12; 312), a chamber (14; 114; 214; 314) made inside the head (12; 312) and/or inside the handle (11) and containing a dentifrice substance (30), at least one duct (22, 122, 222, 322) that communicates said chamber with the external face of the head (12; 312) supporting the set of bristles, and control means acting inside the chamber to push the dentifrice substance (30) so as to cause its discharge from the ducts to impregnate the set of bristles (13).

WO 02/058508 A2

IMPROVED TOOTHBRUSH

DESCRIPTION

5 The present invention refers to an improved toothbrush, particularly suitable for use as a disposable toothbrush, i.e. the throwaway type able to be used only once.

Various forms of toothbrushes are currently known, all of which include a handle or grip and a head consisting of a plate with slots in which tufts of bristles are contained and
10 fixed. During use, the bristles are impregnated with toothpaste generally drawn from a tube of dentifrice. As a rule, such toothbrushes are intended for continuous use, since the selling price does not allow them to be used only once.

On the other hand, the need for a disposable toothbrush is acknowledged in the field,
15 both for hygienic reasons, as well as in certain conditions such as, for example, people travelling, staying in hotels, visiting restaurants and similar. This is why various types of disposable toothbrushes are launched on the market.

However, known disposable toothbrushes need a separate container for the toothpaste
20 which impregnates the toothbrush bristles. This involves some drawbacks, due to the cost and additional bulk of the toothpaste container. Moreover often, due to the toothpastes utilized, the user, after having used the toothbrush, is obliged to rinse his/her teeth, a somewhat difficult task if, for instance, running water facilities are unavailable.

25 The aim of the invention is to resolve the drawbacks of the known art by providing a toothbrush that is practical, versatile, inexpensive and of simple realization.

This aim is reached, according to the invention, with the characteristics listed in the
enclosed independent claim 1.

30

Advantageous embodiments of the invention appear from the dependent claims.

The toothbrush according to the invention includes a head supporting a set of bristles and a handle joined to the head. The characteristic of the invention is that a chamber is made
35 inside the head and/or inside the handle to contain a dentifrice substance. At least one duct connects said chamber with the external face of the head that supports the set of

bristles. Control means function inside the chamber that can be operated by the user to push the dentifrice substance so as to cause its discharge from the ducts to impregnate the set of bristles.

5 The advantages of the toothbrush appear evident according to the invention that eliminates the need to provide a separate container for the dentifrice substance, with consequent savings in both bulk and additional cost.

10 Preferably the dentifrice substance contained in the toothbrush chamber according to the invention is a swallowable fluid mouthwash, which does not require the use of water to rinse the oral cavity. Consequently, the toothbrush of the invention can be preferably used in particular situations in which running water facilities are unavailable.

15 Additional characteristics of the invention will appear clearer from the following detailed description, which refers to purely illustrative and therefore non-limiting embodiments, shown in the enclosed designs, in which:

Fig. 1 is a longitudinal sectional view of a toothbrush according to a first embodiment of the invention, shown in a condition before use;

20

Fig. 2 is a cross-sectional view according to the II-II section line of Fig. 1;

Fig. 3 is a longitudinal sectional view of the toothbrush of Fig. 1, shown in a condition of use;

25

Fig. 4 is a cross-sectional view according to the IV-IV section line of Fig. 3;

Fig. 5 is a longitudinal sectional view of a toothbrush according to a second embodiment of the invention, shown in a condition before use;

30

Fig. 6 is a longitudinal sectional view of the toothbrush of Fig. 5, in a condition of use;

Fig. 7 is a longitudinal sectional view of a toothbrush according to a third embodiment of the invention, shown in a condition before use;

35

Fig. 8 is a longitudinal sectional view of the toothbrush of Fig. 7, in a condition of use;

Figs. 9A, 9B and 9C are three longitudinal sectional views illustrating three subsequent stages of toothbrush use according to a fourth embodiment of the invention.

5 With the help of Figs. 1-4 a first embodiment of the toothbrush of the invention is described, denoted as a whole by the reference number 10.

The toothbrush 10 includes a handle 11, a head 12 slightly protruding from the handle and a set of bristles 13 applied to the head 12, in a known way, to be able to protrude
10 substantially at right angles from it.

A basically parallelepipedal chamber 14 is made inside the head 12, defined by an upper partition wall 15 and a lower partition wall 16. The chamber 14 is filled with a dentifrice substance 30. The term dentifrice substance is used to mean any type of substance usable
15 for oral cleaning, i.e. both a semisolid toothpaste as well as a fluid and swallowable mouthwash that does not require the use of water to rinse the oral cavity.

The upper partition wall 15 has some small through holes or exit ducts 22 to allow the discharge of the dentifrice substance contained in the chamber 14. The set of bristles 13
20 is mounted on the upper partition wall 15. A breakable film or membrane 23, is applied above or under the upper partition 15, and obstructs the exit ducts 22 to protect the dentifrice substance from external contaminants and to avoid its accidental discharge from the ducts 22.

25 A piston 17, is able to slide inside the chamber 14, connected to a rod 18 that extends from the chamber 14 by means of a through hole 19 made in the lower wall 16. A recessed seat 20 is provided under the lower wall 16. The rod 18 terminates in a flange 21 able to be housed in the recessed seat 20.

30 In an initial situation the piston 17 abuts against the lower partition 16 and the chamber 14 is full of dentifrice substance. When the user wishes to use the toothbrush 10, a finger is used to press the flange 21 in the direction of the arrows F. As a result, the piston 17 slides in the chamber 14 pushing the dentifrice substance 30 against the upper partition 15. The pressure of the dentifrice substance breaks the membrane 23 and the dentifrice
35 substance 30 escapes from the ducts 22 of the upper partition 15 impregnating the bristles 13 of the toothbrush, as shown in Figs. 3 and 4.

In this situation the control flange 21 fits in the recessed slot 20, so as not to get in the way during toothbrush use and at this point the user can clean his/her teeth with the toothbrush.

5 The rod 18 can be screw fit engaged with the hole 19. Therefore, the sliding of the piston 17 in the chamber 14 is caused by the user rotating the flange 21.

In the following, similar reference numbers denote similar or corresponding parts to those already described and therefore their detailed description is omitted.

10

With reference to Figs. 5 and 6, a second embodiment of the toothbrush of the invention is described, denoted as a whole by the reference number 100.

15

The toothbrush 100 includes a handle 11, a head 12 and a set of bristles 13 applied to the head 12. A chamber 114 is made inside the body of the handle 11 and is filled with a dentifrice substance 30. The chamber 114 is open above and is covered by a membrane 117 made of rubber or other flexible and/or bendable material.

20

The chamber 114 communicates with a longitudinal channel 131 that in turn communicates with transverse channels 122 leading into the head 12 at the base of the set of bristles 13. Consequently, when the user presses the membrane 117 in the direction of the arrows F, the dentifrice substance 30 is pushed from the chamber 114 into the channel 131 and it escapes from the channels 122 impregnating the bristles 13 as shown in Fig. 6.

25

Clearly the chamber 114 can be located in any position of the body of the handle 11 or may also be located inside the head 12 of the toothbrush.

With reference to Figs. 7 and 8, a third embodiment of the toothbrush of the invention is described, denoted as a whole by the reference number 200.

30

The toothbrush 200 includes a handle 11, a head 12 positioned at one end of the handle 11 and a set of bristles 13 applied to the head 12. An axial chamber 214 is made inside the body of the handle 11 that extends for a good part of the length of the handle 11. The axial chamber 214 is open at the end of the handle 11 opposite the head 12 and is closed near the other end of the handle 11 where the head 12 is situated.

35

The chamber 214 is partially filled with a dentifrice substance 30. A piston 217 can slide, inside the chamber 214, connected to a rod 218 of basically equal length to that of the chamber 214. The rod 218 terminates in a flange 221. The rod 218 has a collar or protruding flexible tabs 233 near the flange 221. In the internal surface of the handle 11 which defines the chamber 214, near the end opposite the head 12, is provided a ring-shaped slot 234 able to house the collar 233.

The axial chamber 214 is partially filled with a dentifrice substance 30 and the piston 217 pushes this dentifrice substance, confining it to a region under the head 12. The head 12 has exit ducts 222 that communicate the chamber 214 with the base of the head 12 in which the bristles 13 are situated.

Therefore, when the user axially pushes the flange 221 in the direction of the arrows F, the piston 217 pushes the dentifrice substance 30 that escapes from the ducts 222 impregnating the bristles 13, as shown in Fig. 8. In this condition the collar 233 of the rod 218 is engaged in the ring-shaped slot 234 of the handle 11, and the flange 221 of the rod 218 abuts against the end of the handle. In this way there are no parts protruding from the handle 11 and the rod is locked inside the handle so as not to be troublesome during use of the toothbrush 200.

With reference to Figs. 9A, 9B, and 9C, a fourth embodiment of the toothbrush of the invention is described, denoted as a whole by the reference number 300.

The toothbrush 300 includes a handle 311, a head 312 joined to the handle 311 and a set of bristles 13 applied to the head 312. A chamber 314 is made axially, inside the body of the head 312, open at one end of the head 312. The chamber 314 includes a first chamber 314' of lesser diameter and a second chamber 314" of greater diameter and open at the end of the head 312.

Exit ducts 322 are made in the head 312 that connect the base of the bristles 13 with the first chamber 314' of lesser diameter. The second chamber 314" of greater diameter has a ring-shaped slot 334 near the open end of the head 312.

The handle 311 includes a first portion of lesser diameter 311' having a diameter basically equal to or slightly less than that of the first chamber 314' and a second portion of greater diameter 311" having a diameter basically equal to or less than the diameter of the second chamber 314" of greater diameter. The handle portion of lesser diameter, 311',

is substantially as long as the chamber of lesser diameter, 314', and the handle portion of greater diameter, 311", is longer than the handle portion of lesser diameter, 311'. The handle portion of greater diameter, 311", has a collar 333 positioned near the handle portion of lesser diameter, 311'.

5

In an initial situation, the chamber of lesser diameter 314' is filled with a dentifrice substance 30 and an end part of the handle portion of greater diameter 311" is engaged inside the chamber of greater diameter 314". In this situation, the free end of the handle portion of greater diameter 311" abuts against the end of the chamber of lesser diameter 314', therefore if an axial thrust is applied on the handle 311 axial sliding of the handle is prevented and thus propulsion of the dentifrice substance 30.

10

When the user wishes to use the toothbrush 300, he/she extracts the handle 311 from the chamber 314, by pulling it in the direction of the arrows F1. Then he/she turns the handle 311, for instance in the direction of the arrows F2. Finally, as shown in Fig. 9A, he/she inserts the handle portion of lesser diameter 311' inside the chamber 314 and applies pressure to the handle in the direction of the arrows F3.

15

At this point, the free end 317 of the handle portion of lesser diameter 311' enters into the chamber of lesser diameter 314' and, acting as a piston, it pushes the dentifrice substance 30 that escapes from the ducts 322 impregnating the bristles 13, as shown in Fig. 9C. In this situation the handle portion of lesser diameter 311' is completely housed inside the chamber of lesser diameter 314' and the collar 333 is engaged inside the ring-shaped slot 334. In this way the head 312 is firmly fixed to the handle 311.

20

25

The protection membrane 23 for the exit ducts 22 of the dentifrice substance 30 described in the first embodiment, can be applied as protection for the discharge ducts 122, 222, 322 of the dentifrice substance described in the second, third and fourth embodiments respectively.

30

The innovation preferably refers to a disposable toothbrush, i.e. the chambers 14, 114, 214 and 314 of the first, second, third and fourth embodiments are filled with a sufficient amount of dentifrice substance for one dose. However, it can be envisaged that the chambers 14, 114, 214 and 314 could be filled with dentifrice substance 30 sufficient for more than one dose, so that the toothbrush can be reused more than once.

35

It is possible for a person skilled in the art to make numerous detail variations and modifications to the present embodiments, anyhow coming within the scope of the invention as said in the enclosed claims.

CLAIMS

1. Toothbrush (10; 100; 200; 300) including a head (12; 312) supporting a set of bristles (13) and a handle (11; 311) joined to said head (12; 312), characterized in that it includes:
- 5 - a chamber (14; 114; 214; 314) made inside said head (12; 312) and/or inside said handle (11) to contain a dentifrice substance (30),
- at least one duct (22; 122; 222; 322) that communicates said chamber (14; 114; 214; 314) with an external face of said head (12; 312) that supports said set of bristles, and
- 10 - control means acting inside said chamber to push said dentifrice substance (30) so as to cause its discharge from said ducts (22; 122; 222; 322) to impregnate said set of bristles (13).
2. Toothbrush (10; 200; 300) according to claim 1, characterized in that said control means include a piston (17; 217; 317) that acts in said chamber, from a retracted position
- 15 in which the chamber is filled with a dentifrice substance to an advanced position in which it pushes the dentifrice substance to make it discharge from said ducts.
3. Toothbrush (10) according to claim 2, characterized in that said chamber (14) is positioned inside the head (12) and the piston (17) acts transversely to the axis of the
- 20 toothbrush.
4. Toothbrush (10) according to claim 3, characterized in that said piston (17) is connected to a rod (18) in turn connected to a flange (21) protruding externally from the head (12), on the side opposite the set of bristles (13), when the piston is in a retracted
- 25 position, so that it can be operated by the user.
5. Toothbrush (10) according to in claim 4, characterized in that a slot (20) is provided in the head part (12) opposite the set of bristles (13) suitable for housing said flange (21), when the piston is in an advanced position.
- 30
6. Toothbrush (200; 300) according to claim 2, characterized in that said chamber (214, 314) is made axially inside the head (12; 312) and/or inside the handle (11; 311) and the piston (217; 317) acts in an axial direction as regards the axis of the toothbrush.

7. Toothbrush (200) according to claim 6, characterized in that the piston (217) is connected to a rod (218) terminating in a flange (221) that protrudes from the rear end of the handle (11), when the piston is in a retracted position.

5 8. Toothbrush (300) according to claim 6, characterized in that said chamber (314) is made axially in said head (312) and said piston (317) is made at one end of the handle (311).

10 9. Toothbrush (300) according to claim 8, characterized in that said chamber (314) includes a first chamber (314') of lesser diameter and a second chamber (314'') of greater diameter and said handle (311) includes a first portion (311) of lesser diameter, having a diameter which is equal to or less than the diameter of the first chamber and a second portion (311'') of greater diameter having a diameter which is less than or equal to the diameter of the second chamber.

15 10. Toothbrush (200; 300) according to any one of the claims from 6 to 9, characterized in that stop means (233, 234; 333, 334) are envisaged which are able to lock the piston (217; 317) in the advance position after having pushed the toothpaste.

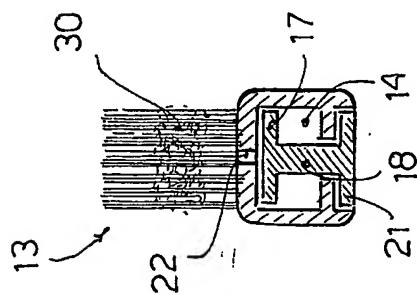
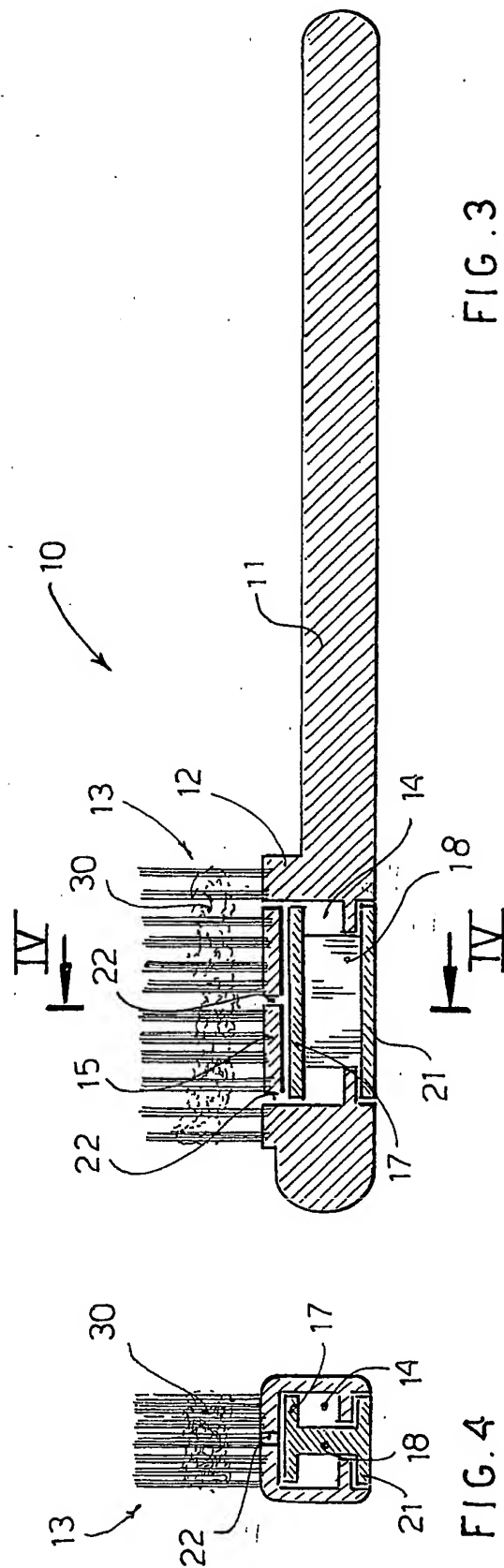
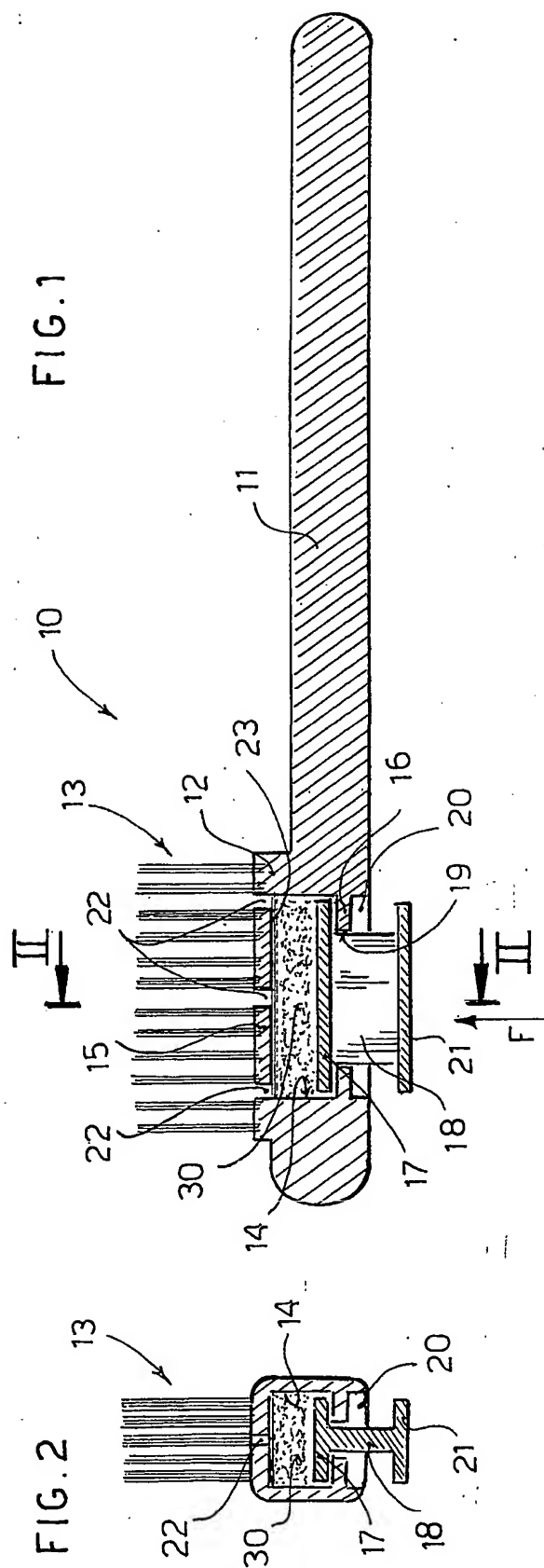
20 11. Toothbrush (200; 300) according to claim 10, characterized in that said stop means are a collar (233; 333) made on the rod of said piston and a ring-shaped seat (234; 334) made in the chamber inside said head or said handle, suitable for housing said collar.

25 12. Toothbrush (100) according to claim 1, characterized in that said control means include a membrane (117) of flexible material positioned on said chamber (114), so that the user, by pressing said strip, can cause said toothpaste to be pushed towards said exit ducts.

30 13. Toothbrush (100) according to claim 12, characterized in that said membrane (117) is made of rubber.

35 14. Toothbrush (10; 100; 200; 300) as in any one of the previous claims, characterized in that said ducts (22; 122; 222; 322) are obstructed by means of a breakable membrane or film (23), which can be broken thanks to the action of the pressure of said dentifrice substance.

15. Toothbrush (10; 100; 200; 300) as in any one of the previous claims, characterized in that said dentifrice substance (30) is a swallowable mouthwash fluid which does not require teeth to be rinsed after use.



2 / 3

